March 16, 2020

Ms. Nancy Rumrill
Water Division
U.S. EPA Region IX, (WTR-4-2)
75 Hawthorne Street
San Francisco, California 94105

Re: Underground Injection Control (UIC) Permit Application No. R9UIC-AZ3-FY19-1 Florence Copper Project, Florence Arizona

Dear Ms. Rumrill:

Florence Copper Inc. (Florence Copper) is submitting the following in response to the letter request for additional information by the U.S. Environmental Protection Agency (USEPA) dated February 13, 2020. In the letter, the USEPA has requested additional information to clarify, modify, or supplement materials submitted with the Underground Injection Control (UIC) Permit Application No. R9UIC-AZ3-FY19-1 transmitted to the USEPA on October 4, 2019 (Application). Florence Copper's responses to each request are provided below under numbered headings that correspond to the USEPA's request letter enclosure.

Several of the Attachments to the application have been revised to reflect the responses to comments as described below. Each of the responses provided below details where changes have been made to the Application. Each of the revised Attachments, complete with Tables, Figures, and Exhibits are provided with this comment response document. Please replace Attachments A, B, C, D, E, and F in your files with the revised Attachments provided herewith.

Request 1: Well Log Data and Testing Results

Comment 1

The Production Test Facility (PTF) wells were tested in accordance with the Arizona Department of Environmental Quality's Aquifer Protection Permit and the UIC Permit, but the PTF is a small area of the proposed in-situ copper recovery (ISCR) project area. Please provide a description in the application of additional pumping tests as wells are drilled and completed in the broader ISCR project area to confirm the PTF data and identify any variability across the project site.

Response to Comment 1

Section B.6.2 of the Application has been updated to include text describing planned aquifer testing that will be conducted to confirm PTF hydraulic data and to further characterize formation hydraulic variability across the site. The additional hydraulic data generated from these tests will be incorporated into an annual update of the project groundwater flow model.

Comment 2

Only one well (R-03) intersects a major fault zone. Please provide a description in the application of additional aquifer testing in or as close as possible to the fault zones.

Response to Comment 2

Section B.6.2 of the Application has been updated to include text describing planned aquifer testing at and adjacent to faults during wellfield expansion. The additional hydraulic data generated from these tests will be incorporated into an annual update of the project groundwater flow model.

Comment 3

Please explain why neutron logs were run without density logs. Please clarify whether the log-based porosity values were developed from compensated neutron-density logging or from just neutron logging.

Response to Comment 3

Section B.4.2 has been updated to clarify and explain the fact that the neutron logs were run without density logs at the PTF wellfield. As described in the PTF pre-operational report (Exhibit B-6), the borehole diameter of the PTF wells is too large for effective use of the neutron-density suite of logs. Consequently, the porosity values were calculated from the neutron logs. The use of the neutron logs was correctly identified in the pre-operational report (Exhibit B-6) and has been corrected in Attachment B of the Application.

Request 2: Attachment A, Area of Review (AoR) Method

Comment 4

Regarding the step rate testing, starting on page 582 in Attachment B of the application, there are several pages of step rate test data where cells are populated with the #REF! Excel error code. Please provide the missing data in the application or explain why it is omitted.

Response to Comment 4

The tabular data presented, beginning on page 582 of the Application, are slug test data for one interval of corehole MC 544 that were included in Volume II of the 1996 Site Characterization Report that was submitted with the UIC and APP applications at that time. The Table shown on these pages is an excerpt from the 1996 application and is reproduced as shown in that application. The columns that show the #REF! Excel error code are the elapsed time in minutes, hours, and days. The basic elapsed time values are shown in the left column of the Table, and the pressure measurements are shown in the right column. These data were omitted by the original author (Brown and Caldwell, 1996) because they are not essential to the interpretation of the test. Florence Copper did not attempt to recreate the missing values, but rather presented the dataset in its entirety as presented in 1996.

Comment 5

Please tabulate and clarify how the 1995 aquifer testing data, the original model K values, and the PTF pump test data align. Please explain how discrepancies have been reconciled.

Response to Comment 5

The original model report (Brown and Caldwell, 2012) is included in Exhibit A-8 of Attachment A of the Application. The data sources and method of tabulation used to develop the hydraulic conductivity profile for the model is described in Section 14A.3.2.2 of the model report. The model refences the use of the 1995 Golder aquifer test data and other data sources. The groundwater model includes a wide array of hydraulic conductivity values that include a degree of variability within each model layer. The hydraulic conductivity values used in the model are shown on Figures 14A-16 through 14A-25 of the 2012 model report. At least a portion of the hydraulic conductivity used in the model were provisional data from the Pinal AMA groundwater model prepared by the Arizona Department of Water Resources (ADWR, 2010). The data obtained from ADWR were used to establish the hydraulic conductivity values outside of the Florence Copper property where few aquifer tests data were available. The data provided by ADWR was cited in the model report as *ADWR, 2010. Regional Groundwater Model of the Pinal Active Management Area; Provisional Data*.

On the Florence Copper site, hydraulic conductivity values were established based on site-specific testing conducted by Golder (1995). The hydraulic conductivity values reported by Golder (1995), span a broad range and includes a wide array of pumping conditions. Brown and Caldwell (1995) does not report how the specific values were selected for use in the model on the Florence Copper site, however, it is assumed that the values were segregated based on well depth, screened intervals, discrete zones of influence, and the degree of influence from interfering factors.

As described in the model update report included in the Application as Exhibit B-5, the hydraulic conductivity of the Bedrock Oxide Zone at the PTF wellfield was estimated to be 0.57 feet per day in the original model report (Exhibit A-8). Aquifer testing conducted at the PTF wellfield yielded a hydraulic conductivity value of 0.54 feet per day. As described in the model update report included in the Application as Exhibit B-5, these values are close enough to one another that the hydraulic conductivity in the original model was left unchanged. The hydraulic conductivity values obtained from ADWR for areas outside the Florence Copper site were also left unchanged given that no new aquifer tests were conducted in those areas.

Comment 6

The K values in Table B-3 are annotated with data quality notes. In developing the original model parameters, identify any data points excluded from the 1995 aquifer testing data due to data quality as indicated in the notes.

Response to Comment 6

The K-values listed in Table B-3 of Attachment B are hydraulic conductivity values derived from aquifer tests conducted at the PTF wellfield. The hydraulic conductivity values listed in Table B-3 are not annotated with data quality notes.

Exhibit B-2 of Attachment B is an aquifer test report prepared by Golder (1995). The hydraulic conductivity values listed on Table E-1 of Exhibit B-2 include comments and notes regarding conditions observed during the aquifer tests. The comments and notes include information that may be used to evaluate the aquifer test results but do not disqualify the data. The aquifer test values reported represent a broad range of conditions and the accompanying notes help to understand how those conditions might have been affected by other ongoing site activities, such as additional pumping wells. Of the notes applied to Table E-1, only notes 3 and 4 show clear reasons to exclude the test results, and only two test results have those notes applied. Brown and Caldwell (2012) did not report specific detail regarding how this data set was incorporated into the original groundwater model. However, as described above, the hydraulic conductivity values applied over the majority of the model domain were derived from ADWR model values, and the values listed in Table E-1 of Exhibit B-2 were used to derive averaged site-specific hydraulic conductivity values.

Comment 7

Please confirm whether any changes were made to porosity for the model update. If so, please identify or highlight these changes in the application.

Response to Comment 7

As described in Exhibit B-5, of Attachment B, of the Application, the porosity values applied in the updated groundwater model were revised from the values used in the 2012 Brown and Caldwell groundwater model. The porosity values used in the original model are listed in Table 14A-4 of Exhibit A-8. The porosity values used in the updated model are listed in Table 1, of Appendix A, of Exhibit B-6 of the Application. Table 1 from Appendix A, of Exhibit B-6 is provided below in response to Comment 9.

Comment 8

Please explain the locations and methods for collecting porosity data used to support the original model. Identify initial porosity data supporting the original model located within the PTF area.

Response to Comment 8

The original model report (Brown and Caldwell, 2012) is included in Exhibit A-8 of Attachment A of the Application. The data sources used to develop the porosity profile for the model is described in Section 14A.4.6 of the model report. Brown and Caldwell (2012) reports that porosity values for model layers 1 through 5 were obtained from the 1990 Pinal AMA model. The porosity values used in the original model are listed in Table 14A-4 of Exhibit A-8. The porosity values used in the 2012 Brown and Caldwell model were obtained from published sources, the locations and methods where ADWR collected porosity data were not provided. The porosity values used for the bedrock portion of the model were estimates made by Brown and Caldwell in support of an earlier groundwater model created in 1996 and were based on published ranges for similar formation materials. The source cited in the 2012 Brown and Caldwell model report is:

> Brown and Caldwell, 1996a. Magma Florence In-Situ Project Aquifer Protection Permit Application, Volume IV of V, Modeling Report. January 1996.

Comment 9

Please tabulate and clarify in the application how the original porosity data, the original model values, and the newer log-based porosity values align. Please explain how any discrepancies have been reconciled.

Response to Comment 9

The porosity values used in the 2012 Brown and Caldwell model are listed together with the neutron log derived porosity values generated at the PTF in Table 1, of Appendix A, of Exhibit B-6 of the Application. The Table is provided again below.

TABLE 1
COMPARISON BETWEEN MODELED POROSITY AND AVERAGE POROSITY MEASURED BY NEUTRON LOGGING
FLORENCE COPPER INC.
FLORENCE, ARIZONA

Model Layer or Unit	Range of Modeled Porosity Values	Average Porosity Measured by Neutron Logging (I-01, I-02, I-03, I-04, and R-01)
Model Layers 1 and 2 (UBFU)	0.13 - 0.2	0.12
Model Layer 3 (MFGU/UBFU)	0.15 - 0.2	0.12
Model Layer 4 and 5 (LBFU)	0.2	0.12
Model Layers 6-10 (Bedrock Oxide)	0.08 for Model Layers 6-8 0.05 for Model Layers 9-10	0.08

Notes:
LBFU = Lower Basin Fill Unit
MFGU = Middle Fine-Grained Unit
UBFU = Upper Basin Fill Unit

As shown in the Table above, the porosity values used in the original model are comparable to those derived from neutron logging at the PTF wellfield. However, the values derived from the neutron logging were used in the updated model as indicated in the model update report provided in Exhibit B-5 of Attachment B, of the Application.

Comment 10

Please provide a discussion in the application of the potential for the dissolution of ore mineral in the fractures to change formation permeability and porosity.

Response to Comment 10

Section B.4.2 of the Application has been revised to include discussion of potential for the dissolution of mineral material to change formation permeability and porosity.

Comment 11

EPA will require that additional neutron logging porosity data be obtained and additional permeability data for the Middle Fine-Grained Unit (MFGU) be obtained as new wells are drilled in the project area. Please include this in the application.

Response to Comment 11

Section B.4.2 of the Application has been revised to indicate that Florence Copper will run one neutron log (or equivalent log, such as a nuclear magnetic resonance log), for the purpose of developing additional porosity data for the Bedrock Oxide Zone at one well in each new resource block to be developed. Florence Copper will also obtain permeability data at one location within each new resource block to be developed during ISCR wellfield buildout.

Comment 12

EPA will require that you confirm K values in the fault zones during future aquifer tests via other wells that intersect the major fault zones. Please include a description of this in the application.

Response to Comment 12

Section B.6.2 of the Application has been updated to include text describing planned aquifer testing that will be conducted to confirm PTF hydraulic data and to further characterize formation hydraulic variability across the site, including faulted areas. The additional hydraulic data generated from these tests will be incorporated into an annual update of the project groundwater flow model.

Request 3: Model Domain

Comment 13

Please provide in the application versions of Figures A4-A13 that contain a legend for the lower images with hydraulic conductivity values.

Response to Comment 13

Figures A4-A13 have been revised to include a legend for the lower panel on each Figure. The revised Figures are included in the revised Attachment A.

Comment 14

There is no map showing the boundary conditions. Please provide a map in the application showing the boundary conditions and explain if the entire northern, southern, and western boundaries are set as general head boundary cells.

Response to Comment 14

The boundary conditions set at the edge of the model domain are shown on Figure 14A-13 of the original model report (Brown and Caldwell, 2012). The Brown and Caldwell (2012) model report is included in Exhibit A-8 of Attachment A. Figure 14A-13 shows that the northern, southern, and western edges of the model domain include no-flow cells where mountains, outcrops, or shallow bedrock are known to occur. The northern, southern, and western edges of the model also include head boundaries. The Brown and Caldwell (2012) model report also describes the sources of information and data used to support the model boundary conditions.

Comment 15

Please confirm which values were assigned to each of the layers in Figures A-3 through A-13 and whether there is any lateral variation in the K values assigned (aside from the higher values for the major fault zones).

Response to Comment 15

Hydraulic conductivity values for each of the model layers shown in Figures A-3 through A-13 have been added to the Figures. The lateral variability of hydraulic conductivity values assigned to each model layer are shown on Figures 14A-16 through 14A-25 in the Brown and Caldwell (2012) model report (Exhibit A-8). The basis for assignment of the hydraulic conductivity values is provided in the Brown and Caldwell (2012) model report.

Request 4: Model Calibration

Comment 16

Please explain in the application what sensitivity analyses were performed to test the effects of uncertainties in model parameters, including K and porosity.

Response to Comment 16

Section A.3.1.2. of Attachment A has been updated to describe sensitivity analyses conducted to evaluate the effects of hydraulic conductivity and porosity on potential preferential groundwater flow pathways.

Request 5: Simulations

Comment 17

Given the variability in the thickness of the Lower Basin Fill Unit (LBFU), please provide a discussion of the potential for vertical migration to reach the LBFU/MFGU contact.

Response to Comment 17

Section A.3.2.2 of Attachment A of the Application has been revised to include discussion of the potential for migration injected fluid to reach the LBFU/MFGU contact.

Comment 18

Please provide a discussion of potential scenarios in which fluid migration during uncontrolled injection might be affected by operations in nearby injection and recovery wells.

Response to Comment 18

Section A.3.2.2 of Attachment A of the Application has been revised to include discussion of potential scenarios in which fluid migration during uncontrolled injection might be affected by operations in nearby injection and recovery wells.

Comment 19

The two main fault zones and numerous other smaller fault zones all generally trend NW/SE. Please provide a further discussion of the potential for preferential flow in the NW/SE direction (e.g., Figure 3 in the modeling update report).

Response to Comment 19

The potential for preferential flow in the mapped fault zones is discussed in the groundwater model update report included in Exhibit B-5 of Attachment B of the Application and Section A.3.2.2 of Attachment A of the Application. Figure 3 of the model update report shows the aggregate effects of preferential flow through two major faults based on hydraulic conductivity values set at 6 feet per day under ambient flow conditions with no recovery pumping. This hydraulic conductivity is 10 times higher than the representative hydraulic conductivity values used for the oxide bedrock layers. No noticeable effects of fault zones, large or small, on hydraulic conductivity and horizontal anisotropy of the formation were observed during the pumping tests conducted at the PTF wellfield (Appendix A of Exhibit B-6). Previous modeling results have shown that the impacts of potential flow through faults during ISCR operations are controlled by balanced recovery pumping.

Attachment B, Geological and Geophysical Information

Request 6: Upper Confinement

Comment 20

Please provide isopach and structure contour maps in the application that include the project site.

Response to Comment 20

Florence Copper has prepared isopach maps which reflect the geologic structure of each formation at the planned ISCR wellfield, which are included in Exhibit B-9 of Attachment B.

Comment 21

Please describe and provide any additional data on the permeability of the MFGU.

Response to Comment 21

The laboratory reports included in Attachment B-1 represent all of the laboratory permeability testing completed on core samples from the MFGU. No other laboratory analyses of the hydraulic characteristics of the MFGU have been completed at the Florence Copper site.

Comment 22

Please describe and provide any pumping test data and results for M56-LBF and the nearby M57-O (in the oxide zone). Please describe and provide any other data indicating hydrologic communication between the LBFU and the oxide units.

Response to Comment 22

Appendix A of the pre-operational report included in Attachment B-6 of the Application describes aquifer tests conducted at both the LBFU and the oxide wells. The hydrographs plotted in Appendix A of the pre-operational report clearly show that the LBFU wells (M54-LBF, M56-LBF, and MW-01 LBF) exhibit a hydraulic response to pumping conducted at oxide wells (R-01, R-03, R-05, and R-07). A muted and delayed response to pumping in the oxide wells is evident LBFU well M-61-LBF also.

Request 7: Lower Confinement

Comment 23

Please provide any available detail on the permeability data for the sulfide zone as shown in Figure 16-3 of the 2017 report (NI 43-101 Technical Report: Florence Copper Project), including how the data were obtained, at which sites, and likely representativeness of the sulfide zone in general.

Response to Comment 23

Section B.2.6 of Attachment B has been revised to include additional information regarding the permeability of the sulfide zone.

Figure 16-3 of the report titled *NI 43-101 Technical Report* (Florence Copper, 2017) was originally generated in support of the Brown and Caldwell (2012) groundwater model report included in Exhibit A-8 of the revised Application. The Figure is included in the 2012 model report (Exhibit A-8) as Figure 14A-11. The model report describes the hydraulic conductivity data included in Figure 14A-11 as values derived from tests of individual water bearing units conducted by previous site owners, Conoco and Magma, and notes that hydraulic conductivity values derived from tests that included multiple water bearing units were excluded from Figure 14A-11 (Brown and Caldwell, 2012).

The data sources used by Brown and Caldwell (2012) in developing this graphic are included in the following two reports:

> Brown and Caldwell, 1996, Volume II of V, Site Characterization Report, Magma Florence in-Situ Project, January 1996.
>
> Golder Associates, 1995. Data Report for Initial Interpretation of the Hydraulic Tests at the Florence Mine Site for Magma Copper Company Aquifer Protection Permit Florence In-Situ Leaching Project.

Table 4.3-2 of the Brown and Caldwell (1996) report has been added to Attachment B of the Application, as Exhibit B-10. The Golder (1995) report was previously provided in the Application as Exhibit B-2 of Attachment B.

Request 8: Attachment C, Well Construction/Conversion Information

Comment 24

Please provide a description of and the supporting Annular Conductivity Device (ACD) data available from the PTF wells to confirm whether fluid migration occurred.

Response to Comment 24

Florence Copper reports the annular conductivity data for the PTF wells to the ADEQ and USEPA quarterly. The most recent quarterly report (2019 Q4) was transmitted to the USEPA in January 2020. The 2019 Q4 quarterly report states that annular electrical conductivity readings have remained approximately constant or increased slightly in 8 of the 11 monitored wells since monitoring began in 2018 Q3. Annual electrical conductivity has decreased in wells O-04, O-06, and WB-01 during that same time. The results of the monitoring indicate the absence of injected fluid at annular conductivity device locations. These monitoring results indicate that no migration of injected fluid has occurred at the well casing/cement seal interface. The PTF ACD data are provided in Exhibit C-1 of the Attachment C of the Application.

Comment 25

Please provide a discussion of the use of a cement grouting shoe at the bottom of the casing to circulate cement in the annulus behind the casing versus the proposed tremie pipe down the casing annulus from the top method related to FCI's experience with construction of the PTF wells.

Response to Comment 25

Section C.3.6 of Attachment C of the Application has been revised to include discussion of the use of a grouting shoe to circulate cement in the annulus behind the casing and to include discussion of Florence Copper experience with various class III well construction methods.

Request 9: Corrective Action

Comment 26

Please provide a description in the application of how the depths to the key formation tops will be determined where the casing will be perforated.

Response to Comment 26

Attachment E, Section E.3.1 of the Application has been revised to indicate that formation tops will be identified based on corehole logs, or information obtained from the site geologic model. Where the contact depth cannot be determined, the entire length of the casing will be perforated, and the entire length of the annulus will be cemented.

Comment 27

Please provide the actual cementing record, if available, and depict the formation tops and perforated intervals on the plugging and abandonment well and corehole diagrams if the casing/wellbore annuli were not cemented when constructed.

Response to Comment 27

All available cementing records for wells and coreholes located within the proposed AOR are provided in Exhibits to Attachment A of the Application. Construction and cementing records for the PTF wells are included in Attachment A, Exhibit A-5 of the Application. Construction and cementing records for the BHP class III wells are included in Attachment A, Exhibit A-6 of the Application. Construction and cementing records for the non-class III wells located within the AOR are included in Attachment A, Exhibit A-7 of the Application. No cementing records exist for the coreholes located within the AOR, and it is generally understood that corehole annuli were not cemented when the coreholes were drilled. Florence Copper plans to perforate any casings, collars, or other tubing found in coreholes, if it cannot be removed to the required clean-out depth, and then the entire annulus will be cemented.

Attachment D, Injection Operation and Monitoring Program

Request 10: Groundwater Monitoring

Comment 28

Please provide or reference details on planned closure and post-closure monitoring in the application, including timeframe, frequency, sampling parameters, and the locations of all wells to be sampled (e.g., POC, verification, any other monitoring wells).

Response to Comment 28

Closure and post-closure monitoring are described in the application to amend APP No. P-101704 (APP application) which was transmitted to ADEQ on June 12, 2019, with copy sent to the USEPA. The time frame, frequency, and sampling parameters are described in Attachments to the APP application as described below:

28.1
The time frame for post-closure monitoring is 30 years after closure is completed, which corresponds to the extent of the post-closure Discharge Impact Area determined in conjunction with the APP application. The 30-year post-closure period is referenced in Attachment F of the UIC Application and Attachments 3, 12, and16 of the APP application. Attachment 12 and Attachment 16 of the APP application are included in Exhibit D-7 of the Application.

28.2
The frequency of closure and post-closure monitoring is described in Attachment 16 of the APP application. Groundwater monitoring at the POC wells will be conducted quarterly throughout the post-closure period with Level 1 monitoring conducted three quarters per year and Level 2 monitoring conducted one quarter per year. Attachment 16 of the APP application is included in Exhibit D-7 of the Application.

28.3

The proposed monitoring parameters are described in Attachment 15 of the APP application, and are the same parameters currently monitored in conformance with APP No. P-101704 and UIC R9UIC-AZ3-FY19-1. The monitoring parameters are listed in Exhibit 15-1 of Attachment 15 of the APP application and Exhibit D-7 of the Application.

28.4

The location of all POC wells proposed for monitoring during the post-closure period are shown on Figure 12-1 and listed in Table 12-1 of Attachment 12 of the APP application included in Exhibit D-7 of the Application.

28.5

Florence Copper herein proposes to retain one ISCR well per resource block for use in verification monitoring for a period of 5 years after closure of each resource block. Florence Copper plans to close resource blocks as leaching is progressively completed during active ISCR operations, and that approximately eight resource blocks will be active at the end of ISCR operations.

The verification wells will be retained for a period of 5 years, regardless of the time when the resource block ceases ISCR operations. If after the 5 year verification period, the verification well continues to meet water quality criteria set forth in the APP and UIC permits for closure, the verification well will be plugged and abandoned. Leaching will be completed at individual resource blocks prior to the cessation of ISCR operations. The ISCR wells proposed for retention as verification wells are listed on the Figure included in Exhibit D-8 of Attachment D of the Application.

Request 11: Fluid Stream Composition

Comment 29

Please provide a discussion in the application of how the experimental runs relate to the duration of planned operations, including any extrapolation from the experimental work needed to guide operational and restoration plans.

Response to Comment 29

Section D.3.5 of Attachment D of the Application has been revised to include discussion of the planned project duration relative to laboratory analysis of site-specific formation material and PTF derived ISCR solutions.

Comment 30

Please provide a discussion in the application of what was learned from the PTF regarding the development of a mature pregnant leach solution (PLS).

Response to Comment 30

Section D.2 of Attachment D of the Application has been revised to include discussion of the development of mature PLS based on PTF operational experience. As of mid-February 2020, the PTF pilot wellfield has produced a commercial grade PLS from the center recovery well for approximately 10 months. The solutions generated from the PTF wellfield provide a direct and relevant example of the anticipated solution composition to be produced by the planned commercial scale ISCR operations.

Request 12: Hydraulic Control During the PTF

Comment 31

Please provide a description of whether data indicate any lapses in hydraulic control during PTF operations.

Response to Comment 31

Section D.2.2 of Attachment D of the Application has been revised to include discussion of hydraulic control monitoring conducted during PTF operations.

Comment 32

Please provide a discussion in the application of any differences between the PTF and the larger full-scale operation that could affect the ability to maintain hydraulic control during commercial operations.

Response to Comment 32

Section D.2.2 of Attachment D of the Application has been revised to include discussion scalability of the hydraulic control method applied at the PTF to the planned commercial ISCR wellfield. The PTF was designed at the same scale as the commercial ISCR wellfield. Because the PTF wellfield was designed at the same scale as the planned commercial wellfield, the successful demonstration of hydraulic control at the PTF wellfield indicates that hydraulic control can be maintained at the commercial wellfield using the same methodology applied at the PTF.

Request 13: Attachment E, Plugging and Abandonment Plan

Comment 33

In Section E.2.1, the following text excludes non-Class III wells and coreholes located within the AOR - "All abandonment notifications, approvals, procedures, documentation, and reporting required under this plan apply to all Class III wells constructed within the commercial-scale AOR, which includes the PTF wells and BHP test wells." Please explain those omissions or add them to the text.

Response to Comment 33

The text in Section E.2.1 of Attachment E of the Application has been revised to indicate that the Plugging and Abandonment Plan applies to all wells within the AOR.

Comment 34

In the following sentence on page E-3, please replace "PTF" with "ISCR:" "At the conclusion of PTF operations, proposed Class III wells within the AOR will remain open for use in monitoring groundwater conditions until ADEQ and USEPA give approval to plug and abandon the wells."

Response to Comment 34

The requested text change has been made and is included in Section E.2.4 of Attachment E of the Application.

Comment 35

In the following language on page E-3, please clarify or correct the omission of observation wells and closure wells within the wellfield during post-closure monitoring: "Post-closure monitoring at the point of compliance (POC) wells and supplemental monitoring wells will continue following completion of formation rinsing for the period of time specified in the APP and the UIC Permit. The POC wells will remain open for the period of time necessary to complete closure and post-closure monitoring specified in the APP and the UIC Permit."

Response to Comment 35

The text of Section E.2.4 Attachment E of the Application has been revised to include the requested clarification.

Comment 36

Section E.2.4 of the application on page E-3 states: "Not more than 2 years following the provisional closure of an ISCR well, the well will be abandoned in accordance with procedures outlined in this plan and requirements set forth in the UIC Permit and the APP". Please note that all ISCR wells should not be abandoned after "not more than 2 years". Post-closure monitoring will require retention of closure verification wells converted from ISCR wells within the wellfield for a period of at least five years. Additional rinsing may also be necessary if exceedances occur during post-closure monitoring. Please clarify.

Response to Comment 36

The text of Section E.2.4 Attachment E of the Application has been revised to include the reference to verification wells that will remain open for a period of 5 years.

Request 14: Shaft Abandonment

Comment 37

Please add a full description of the shaft abandonment procedures and/or reference the EPA 7520-19 form and well diagrams in the application.

Response to Comment 37

A description the shaft abandonment procedures has been added to Section E.3.1 of Attachment E of the Application. Reference to the plugging and abandonment forms for the shafts has been added to Section E.4 of Attachment E of the Application. The plugging and abandonment forms and diagrams are included in Exhibit E-2 of Attachment E of the Application.

Comment 38

Please clarify in the application the intent and procedures for removal of obstruction in the shafts and provide cost estimates for plugging and abandonment of the shafts.

Response to Comment 38

Reference to the removal of obstructions from the shafts has been added to Section E.3.1 of Attachment E of the Application. Florence Copper proposes to convert one of the shafts to recovery well for use in ISCR operations. The cost estimate to abandon the shafts is included in Exhibit F-2 of Attachment F of the Application. The cost estimate includes costs to abandon the shaft well and the second shaft.

Request 15: Attachment F, Financial Assurance

Comment 39

Please provide a description and a draft financial instrument in the application for EPA's review. The instrument should meet the UIC requirements and the recommendations (e.g., in EPA's Class VI Financial Responsibility (FR) Guidance, Class II FR Guidance, and consistent with 40 CFR §144.52(a)(7) and 40 CFR Subpart F), and include a complete list of the wells, post-closure monitoring and restoration activities that will be covered by the instrument.

Response to Comment 39

A draft of the financial assurance mechanism has been added to Attachment F of the Application as Exhibit F-3. The post-closure monitoring and restoration activities covered by the financial assurance instrument are listed in Table F-1 of Attachment F of the Application. The complete list of wells to be plugged and abandoned after cessation of ISCR operations are listed in the Table included in the Application as Exhibit F-4.

Please contact me at 520-316-3710 if you require any additional information.

Sincerely,
Florence Copper Inc.

Richard Tremblay
Vice President Operations

cc: David Albright, USEPA
Maribeth Greenslade, ADEQ
Anita Thompkins, USEPA Office of Groundwater and Drinking Water